COURSE SPECIFICATION DOCUMENT

Academic Department: Science, Innovation & Technology

Programme: Computer Science

FHEQ **Level:**   5

Course Title: Ethical and Sustainable Computing

Course Code: COMP 5103

Student Engagement Hours:	160
Timetabled Hours:	45
Guided Learning Hours:	15
Independent Learning Hours:	100

Credits: 16 UK CATS credits
                     8 ECTS Credits
                     4 UK Credits

Course Description:

This course explores ethics and sustainability in the context of computing technologies giving an overview of ethical theories, sustainable practices and their application to computer science. Students use the ACM and IEEE codes of conduct frameworks to explore in detail ethical issues in data collection, surveillance, bias and fairness in AI algorithms, as well as the BCS codes of ethics for computing professionals, whistleblowing and ethical responsibilities in the workplace, ethical decision-making, frameworks for IT professionals. Case studies are used across various contexts relating UN SDGs to computer architectures, networks, data storage systems and how they could be improved to be more ethical and sustainable.

Prerequisites:

40 credits, LIBA 4301 Academic Research and Writing

Aims and Objectives:

By the end of this course, students will have a good understanding of ethical theories and sustainable computing and their application to computer science. How these relate to professional codes of ethics, frameworks for IT professionals and UN SDGs in computing technologies, in computer architectures, networks, data storage systems and sensor systems to enable them to make informed and responsible choices about their own values and possible careers in any area of computer science.

Programme Outcomes:

L5 AI, II, CI, II, DI, II

A detailed list of the programme outcomes are found in the Programme Specification. This is located at the archive maintained by Registry and found at: https://www.richmond.ac.uk/programme-and-course-specifications/

Learning Outcomes:

By the end of this course, successful students should be able to:

- Understand ethical theories and their application to computer science.

- Understand ACM, IEEE codes of conduct and UN SDGs and their application to computer science.

- Demonstrate knowledge of how hardware systems could be made sustainable.

- Demonstrate knowledge of how data and data systems could be built and managed in an ethical, green and sustainable way.

- Understand and propose ethical, green and sustainable programming and data storage solutions to specific industry contexts.

Indicative Content:

- What is ethics?
- ACM, IEEE codes of conduct and UN SDGs and their application to computer science.
- What is sustainability?
- Digital Literacy
- Ethics and AI
- Power management
- Green computer Architectures
- Data and data centres energy use
- Inter connection technology
- Ethical and Sustainable Programming
- Sensor network protocols
- Recycling hardware
- Defining personal values

Assessment:

This course conforms to the University Assessment Norms approved at Academic Board and located at: https://www.richmond.ac.uk/university-policies/

Teaching Methodology:

This course will be delivered face to face through a combination of lectures and interactive sessions. In addition to classroom activities, there are guided learning elements that are tutor led and arranged through Blackboard. These activities can be asynchronous online sessions, flipped classrooms, set readings with discussion boards or set guest lectures for example. Set activities are monitored by the instructor to ascertain student engagement. Students are encouraged to prepare for class and to play an active part, to raise questions, following-up ideas and interact with a wide range of provided material.

Indicative Text(s):

Ahad, M. A., Paiva, S. and Zafar, S. (eds.) (2020) *Sustainable and Energy Efficient Computing Paradigms for Society.* EAI / Springer Innovations in Communication and Computing.

Beever, J., McDaniel, R. and Stanlick, N. (2019) *Understanding Digital Ethics*. Abingdon: Routledge.

Pande, P. P., Ganguly, A. and Chakrabarty, K. (eds.) (2013) *Design Technologies for Green and Sustainable Computing Systems.* Springer.

Sabban, A. (ed.) (2021) *Green Computing Technologies and Computing Industry In 2021*. London: Intech Open.

Journals/Additional Texts

Computing. Available at: https://link.springer.com/journal/607 (Accessed: November 2024).

Change Log for this CSD:

Nature of Change	Date Approved & Approval Body (School or AB)	Change Actioned by Registry Services
First Edition	Nov 2024	